

Claims

1. A method for operating an internal combustion engine including a fuel pressure accumulator (7) in order to provide
5 a fuel volume which must be injected, said fuel volume having a reference pressure, wherein pressure in the fuel pressure accumulator is generated via a high-pressure pump (6), wherein the high-pressure pump (6) is supplied with an adjustable fuel flow,
10 wherein in a first operating mode the pressure in the fuel pressure accumulator (7) is adjusted to the reference pressure by regulating the fuel flow of the fuel delivered to the high-pressure pump (6) depending on the fuel volume which must be injected and the reference pressure,
15 wherein in a second operating mode the pressure in the fuel pressure accumulator (7) is adjusted to the reference pressure by setting the pressure in the fuel pressure accumulator (7) to the reference pressure by allowing fuel to escape from the fuel pressure accumulator (7) in the event of a predetermined
20 fuel flow.
2. The method as claimed in claim 1, wherein the second operating mode is adopted if the fuel flow is less than a first fuel flow and/or
25 wherein the first operating mode is adopted if the fuel flow exceeds a second fuel flow.
3. The method as claimed in claim 2, wherein the second operating mode is adopted when the internal combustion engine
30 is idling and/or in the case of overrun cut-off.
4. The method as claimed in claim 2 or 3, wherein the first fuel flow is smaller than the second fuel flow.

5. The method as claimed in one of the claims 2 to 4, wherein the first and/or the second fuel flow is determined from a fuel leakage flow, wherein the fuel leakage flow is determined in accordance with the following steps:

- 5 - setting an overrun operation of the internal combustion engine so that no fuel is injected;
- setting the pressure in the fuel pressure accumulator to a first pressure value;
- setting the reference pressure in order to increase the
10 pressure in the fuel pressure accumulator in accordance with the first operating mode;
- measuring the time for the pressure rise to the second pressure;
- determining the fuel leakage flow using the time for the
15 pressure rise and using the pressure difference between first pressure and second pressure.

6. The method as claimed in one of the claims 1 to 5, wherein in the first operating mode essentially no fuel is allowed to
20 escape from the fuel pressure accumulator (7).

7. A fuel system for an internal combustion engine including a fuel pressure accumulator (7) in order to provide a fuel volume which must be injected, said fuel volume having a
25 reference pressure, including a high-pressure pump (6) in order to generate pressure in the fuel pressure accumulator (7),

including a volume flow control valve (3) in order to supply the high-pressure pump (6) with an adjustable fuel flow,

30 including a regulator valve (10) in order to carry fuel away from the fuel pressure accumulator (7),

and including a control unit (9) which is connected to the volume flow control valve in order to adjust the pressure in the fuel pressure accumulator (7) in a first operating mode by

means of the fuel flow of the fuel which is delivered to the high-pressure pump (6) depending on the fuel volume which must be injected and the reference pressure, and wherein the control unit (9) is connected to the regulator valve (10) in order to close the regulator valve (10) in the first operating mode and to adjust the pressure in the fuel pressure accumulator (7) to the reference pressure by carrying the fuel away from the fuel pressure accumulator (7) in a second operating mode.

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8. The fuel system as claimed in claim 7, wherein in the second operating mode the regulator valve (10) carries the surplus fuel away from the fuel pressure accumulator (7) into a fuel line (4) which connects the volume flow control valve (3) to a low-pressure pump (2).

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9. The fuel system as claimed in claim 7 or 8, wherein the regulator valve (10) is arranged at the output of the high-pressure pump (6).

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10. The fuel system as claimed in claim 7 to 9, wherein the control unit has a switch unit (12) for switching between the first operating mode and the second operating mode, wherein the switch unit (12) switches into the second operating mode when the fuel flow through the volume flow control valve (3) falls below a first fuel flow, and/or wherein the switch unit (12) switches into the first operating mode when the fuel flow through the volume flow control valve (3) exceeds a second fuel flow.

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